CLAIMS:

1. A method of making an excimer laser crystal optic, said method comprising:

providing a magnesium fluoride crystal solid precursor

nonmetallically crushing said magnesium fluoride solid precursor to provide a crushed low metal contaminant magnesium fluoride feedstock,

providing a c axis oriented magnesium fluoride seed crystal,

providing a magnesium fluoride crystal growth crucible, said crystal growth crucible having a seed crystal reservoir for receiving an oriented seed crystal,

inserting said c axis oriented magnesium fluoride seed crystal into said crystal growth crucible seed crystal reservoir,

loading said crushed magnesium fluoride feedstock into said crystal growth crucible,

melting said loaded crushed magnesium fluoride feedstock to provide a precrystalline magnesium fluoride melt,

growing a c axis oriented magnesium fluoride crystal from said precrystalline magnesium fluoride melt,

cooling said grown magnesium fluoride crystal to provide a magnesium fluoride laser crystal with a 42 mm crystal 120 nm transmission of at least 30%,

and forming said magnesium fluoride laser crystal into an excimer laser crystal optic.

2. A method as claimed in claim 1, wherein providing a magnesium fluoride crystal solid precursor includes providing a purified magnesium fluoride crystal solid precursor.

3. A method as claimed in claim 1, wherein nonmetallically crushing said magnesium fluoride solid precursor includes containing said magnesium fluoride within a flexible nonmetallic container while crushing.

4. A method as claimed in claim 1, wherein nonmetallically crushing said magnesium fluoride solid precursor includes providing a nonmetallic crusher.

5. A method as claimed in claim 1, wherein nonmetallically crushing said magnesium fluoride solid precursor includes containing said magnesium fluoride within a flexible nonmetallic container and applying a nonmetallic crushing force to said solid precursor through said flexible nonmetallic container.

6. A method as claimed in claim 1, said method including providing a contaminant scavenger and scavenging contaminants from said magnesium fluoride.

7. A method as claimed in claim 1, wherein melting said crushed magnesium fluoride feedstock to providing a precrystalline magnesium fluoride melt includes melting no more than 90% of said c axis oriented magnesium fluoride seed crystal.

8. A method as claimed in claim 1, wherein growing a magnesium fluoride crystal includes lowering said crystal growth crucible through a magnesium fluoride crystal growth temperature gradient at a rate no greater than 1 mm per hour.

9. A method as claimed in claim 1, wherein forming said magnesium fluoride laser crystal into an excimer laser crystal optic includes forming said laser crystal into a magnesium fluoride crystal optic window.

10. A method as claimed in claim 1, wherein forming said magnesium fluoride laser crystal into an excimer laser crystal optic includes forming said laser crystal into a magnesium fluoride crystal optic prism.

11. A method as claimed in claim 1, wherein said crushed low metal contaminant magnesium fluoride feedstock has metal contaminant levels less than 1 ppm by weight.

12. A method as claimed in claim 1, wherein said crushed low metal contaminant magnesium fluoride feedstock has transition element metal contaminant levels no greater than .7 ppm by weight.

13. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has a Fe contamination level less than .15ppm Fe by weight.

14. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has a chrome contamination level less than .06ppm chrome by weight

15. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has a copper contamination level less than .02ppm copper by weight

16. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has a cobalt contamination level less than .02ppm cobalt by weight

17. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has an Al contamination level less than .7ppm Al by weight

18. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has a nickel contamination level less than .02ppm nickel by weight.

19. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has a vanadium contamination level less than .02ppm vanadium by weight.

20. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has a lead contamination level less than .02ppm lead by weight.

21. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has a molybdenum contamination level less than .02ppm molybdenum by weight.

22. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has a manganese contamination level less than .02ppm manganese by weight.

23. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has a 42mm crystal 120nm transmission of at least 35%.

24. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has a 255nm induced absorption less than .08 Abs/42mm when exposed to 5 million pulses of 193nm light at a fluence $\geq$ 40mj/cm^2/pulse.

25. A method as claimed in claim 1, wherein said magnesium fluoride laser crystal has an 200 to 210 nm range absorption coefficient < 0.0017 cm^{-1}.

26. A method of making a magnesium fluoride optical crystal, said method comprising:

providing a magnesium fluoride crystal solid precursor,

nonmetallically crushing said magnesium fluoride solid precursor to provide a crushed low metal contaminant magnesium fluoride feedstock,

providing a magnesium fluoride crystal growth crucible,

loading said crushed magnesium fluoride feedstock into said crystal growth crucible,

melting said loaded crushed magnesium fluoride feedstock to provide a precrystalline magnesium fluoride melt,

growing a magnesium fluoride crystal from said precrystalline magnesium fluoride melt,

cooling said grown magnesium fluoride crystal to provide a magnesium fluoride optical crystal.

27. A method as claimed in claim 26, wherein providing a magnesium fluoride crystal solid precursor includes providing a purified magnesium fluoride crystal solid precursor.

28. A method as claimed in claim 26, wherein nonmetallically crushing said magnesium fluoride solid precursor includes containing said magnesium fluoride within a flexible nonmetallic container while crushing.

29. A method as claimed in claim 26, wherein nonmetallically crushing said magnesium fluoride solid precursor includes providing a nonmetallic crusher.

30. A method as claimed in claim 26, wherein nonmetallically crushing said magnesium fluoride solid precursor includes containing said magnesium fluoride within a flexible nonmetallic container and applying a nonmetallic crushing force to said solid precursor through said flexible nonmetallic container.

31. A method as claimed in claim 26, wherein said crushed low metal contaminant magnesium fluoride feedstock has metal contaminant levels less than 1 ppm by weight.

32. A method as claimed in claim 26, wherein said crushed low metal contaminant magnesium fluoride feedstock has transition element metal contaminant levels no greater than .7 ppm by weight.

33. A method as claimed in claim 26, wherein said a magnesium fluoride optical crystal has a Fe contamination level less than .15ppm Fe by weight.

34. A method as claimed in claim 26, wherein said magnesium fluoride optical crystal has a chrome contamination level less than .06ppm chrome by weight

35. A method as claimed in claim 26, wherein said magnesium fluoride optical crystal has a copper contamination level less than .02ppm copper by weight

36. A method as claimed in claim 26, wherein said magnesium fluoride optical crystal has a cobalt contamination level less than .02ppm cobalt by weight

37. A method as claimed in claim 26, wherein said magnesium fluoride optical crystal has an Al contamination level less than .7ppm Al by weight

38. A method as claimed in claim 26, wherein said magnesium fluoride optical crystal has a nickel contamination level less than .02ppm nickel by weight.

39. A method as claimed in claim 26, wherein said magnesium fluoride optical crystal has a vanadium contamination level less than .02ppm vanadium by weight.

40. A method as claimed in claim 26, wherein said magnesium fluoride optical crystal has a lead contamination level less than .02ppm lead by weight.

41. A method as claimed in claim 26, wherein said magnesium fluoride crystal has a molybdenum contamination level less than .02ppm molybdenum by weight.

42. A method as claimed in claim 26, wherein said magnesium fluoride crystal has a manganese contamination level less than .02ppm manganese by weight.

43. A method as claimed in claim 26, wherein said magnesium fluoride optical crystal has a 120nm transmission of at least 30%.

44. A method as claimed in claim 26, wherein said magnesium fluoride optical crystal has a 255nm induced absorption less than .08 Abs/42mm when exposed to 5 million pulses of 193nm light at a fluence $\geq$ 40mj/cm^2/pulse.

45. A method as claimed in claim 26, wherein said magnesium fluoride optical crystal has an 200 to 210 nm range absorption coefficient < 0.0017 cm^{-1}.

46. A method of making an optical fluoride crystal, said method comprising:

providing a fluoride crystal solid precursor,

nonmetallically crushing said fluoride solid precursor to provide a crushed low metal contaminant fluoride crystal feedstock,

providing a fluoride crystal growth crucible,

loading said crushed fluoride crystal feedstock into said crystal growth crucible,

melting said loaded crushed fluoride crystal feedstock to provide a precrystalline fluoride melt,

growing a fluoride crystal from said precrystalline fluoride melt,

cooling said grown fluoride crystal to provide an optical fluoride crystal.

47. A method as claimed in claim 46, wherein providing a fluoride crystal solid precursor includes providing a purified fluoride crystal solid precursor.

48. A method as claimed in claim 46, wherein nonmetallically crushing said magnesium fluoride solid precursor includes containing said magnesium fluoride within a flexible nonmetallic container while crushing.

49. A method as claimed in claim 46, wherein nonmetallically crushing said magnesium fluoride solid precursor includes providing a nonmetallic crusher.

50. A method as claimed in claim 46, wherein nonmetallically crushing said magnesium fluoride solid precursor includes containing said magnesium fluoride within a flexible nonmetallic container and applying a nonmetallic crushing force to said solid precursor through said flexible nonmetallic container.

51. A method as claimed in claim 46, wherein said crushed low metal contaminant magnesium fluoride feedstock has metal contaminant levels less than 1 ppm by weight.

52. A method as claimed in claim 46, wherein said crushed low metal contaminant magnesium fluoride feedstock has transition element metal contaminant levels no greater than .7 ppm by weight.

53. A method as claimed in claim 46, wherein said optical fluoride crystal has a 120nm transmission of at least 30%.

54. A method as claimed in claim 46, wherein said optical fluoride crystal has a 255nm induced absorption less than .08 Abs/42mm when exposed to 5 million pulses of 193nm light at a fluence $\geq$ 40mj/cm^2/pulse.

55. A method as claimed in claim 46, wherein said optical fluoride crystal has a 200 to 210 nm range absorption coefficient < 0.0017 cm^{-1}.